FINAL ASSESSMENT REPORT

**Evaluation of Undergraduate Programs –
Civil Engineering**

Faculty of Engineering

Cyclical review period: 2020–2021

Date: June 15, 2023

I. Programs

- BASc in Civil Engineering
- BASc in Civil Engineering, Environmental and Water Resources Option
- BASc in Civil Engineering, Structural and Geotechnical Option
- BASc in Civil Engineering, Engineering Management and Entrepreneurship Option
- BASc in Civil Engineering and BSc in Computing Technology

II. Evaluation process

- This Final Assessment Report is based on the following documents: (a) the self-study brief produced by the program managers; (b) the external review report drafted after the external reviewers' visit; and (c) commentary from Jacques Beauvais, Dean of the Faculty of Engineering; Mamadou Fall, Director of the Department of Civil Engineering; and Hassan Aoude, Associate Director of the Program.
- The visit took place virtually on November 8 and 9, 2022, with the participation of Moncef L. Nehdi from McMaster University and Sumi Siddiqua from the University of British Columbia. The External Review Committee received a copy of the comprehensive self-study brief that had been approved by the Program Committee on September 30, 2021.
- The External Review Committee met with various individuals and groups: (1) Marcel Turcotte, Director, Program Review; (2) Jacques Beauvais, Dean, Engineering; (3) Michel Labrosse, Vice-Dean, Undergraduate Studies; (4) David Taylor, Vice-Dean, Quality Assurance and Teaching Innovation; (5) Mamadou Fall, Director, Department of Civil Engineering; (6) Hassan Aoude, Associate Director, Civil Engineering; (7) members of faculty for the Structural and Geotechnical Option; (8) members of faculty for the Hydraulic, Environmental and Geotechnical Option; (9) part-time professors; (10) students; (11) staff from the Office of Undergraduate Studies; (12) laboratory staff; and (13) key support staff members.

III. Summary of reports on program quality

IDENTIFICATION OF STRENGTHS AND CHALLENGES

STRENGTHS

- Practical components, such as the labs, field school, co-op program, graduating project and engineer-in-residence support. The field school, which is unique to the University of Ottawa's civil engineering program, seems to be very popular with students.

- The atmosphere within the unit is collegial. Faculty are also very productive and proud of their achievements.
- Support staff are exceptional. They are also in tune with students' needs and, more broadly, make sure that the Department runs smoothly.

  CHALLENGES

- Communication with students could be improved when it comes to workload/distribution and assessments.
- Some courses need to be thoroughly revamped in order to bring them up to date. In addition, the content of some courses (e.g., GNG 4170/4570 – Engineering Law and CVG 4097 – Engineering Design Project) should be reviewed to ensure the stated objectives are met.
- Some third-year courses and almost all fourth-year courses are offered in English only. This is seen as a disadvantage by Francophone students.
- The large number of part-time instructors continues to be a major challenge for the unit, potentially affecting the program in terms of its professional accreditation, sustainability and consistency.
- Space for the geotechnical labs continues to be a problem, which could impact the effectiveness of the lab component and the student experience.

IV. Program improvements[1]

> The programs under review meet the standards of the discipline. The following recommendations aim to maintain or increase the programs' level of quality.

Recommendation 1: That training be provided for academic, administrative and technical support personnel and teaching assistants to instil a culture of equity, diversity and inclusion (EDI).

Recommendation 2: That the Department of Civil Engineering be more proactive in addressing gender and equity gaps in future hiring.

Recommendation 3: That communication with part-time professors and their working conditions be improved.

Recommendation 4: That the student-teaching assistant ratio not exceed 15 to ensure that students benefit from the laboratories.

Recommendation 5: That communication regarding student mental health issues be enhanced at the program level, as well as between the program, the Faculty and the University.

Recommendation 6: That the curriculum be modernized, with an emphasis on innovation, EDI, and the development of options better suited to major global challenges.

V. Action plan

The program managers concur with the external reviewers' recommendations. Actions to be taken and timelines are clearly defined, and the Office of the Dean agrees with them.

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[1] Based on the external review report.

VI. Conclusion

In general, the University of Ottawa's civil engineering program is strong and well articulated. The program boasts high-calibre instructors, administrative staff and technical support personnel, and the work environment is collegial.

The unit's other forces include bilingualism—a unique aspect of the program that makes it attractive for recruiting students both inside and outside Canada. Excellent practical activities, such as labs, field work, the design project and co-op experience are also noted. In addition, students have access to a series of excellent courses on the fundamentals of mathematics.

The External Review Committee also identified challenges that the unit has to overcome. Offering courses in both languages is proving difficult. The large number of part-time professors is also seen as an issue, as it could affect the consistency and viability of the program, as well as its professional accreditation. The Committee additionally suggested that tools be developed for critical analysis purposes with a view to modernizing the curriculum and the courses. This would make the program more attractive for students and ensure better alignment with workplace requirements and current global challenges. Restructuring the laboratories (e.g., hybrid versus physical) would reduce student workload, allow for greater participation in extracurricular activities and, lastly, enhance the student experience. In addition, job satisfaction among laboratory staff could be improved by ensuring that position titles reflect staff roles and expertise. The unit might also want to give careful consideration to incorporating topics related to identity, diversity, inclusion, decolonization and Indigenization into the program. Finally, in terms of infrastructure, lab space for the geotechnical and geo-environmental components continues to be a major challenge, requiring frank discussions between the unit and the central administration.

Schedule and timelines

A progress report outlining completed actions and results obtained is to be submitted to the Review Committee by June 15, 2025.

The next cyclical review will take place in no more than eight years, i.e., by 2027–2028. The self-study brief must be submitted no later than June 15, 2027.

Unit Response and Action Plan

Faculty:
- Faculty of Engineering

Department:
- Department of Civil Engineering

Programs evaluated:
- B.A.Sc. in Civil Engineering
- B.A.Sc. in Civil Engineering, Engineering Management and Entrepreneurship Option
- B.A.Sc. in Civil Engineering, Environmental and Water Resources Option
- B.A.Sc. in Civil Engineering, Structural and Geotechnical Option

Cyclical review period:
- 2020-2021

Date:
- 2023-05-08

General comments:

On December 18 2022, the Civil Engineering program was made aware of the External Review Report produced in the context of the cyclical program evaluation. The Civil Engineering undergraduate program is committed to providing an outstanding teaching and training experience for students, and therefore we were pleased to see that the external reviewers found that our "program is well rounded and strong", that it "relies on an excellent practical component that combines labs, field work, capstone design project, and co-op experience", that the program "is generally well designed", that "the curriculum is generally coherent" and that the program "is generally aligned with the University's Degree Level Expectations". We were also gratified to learn that the evaluators found that: "overall, students expressed satisfaction with the program" and have a "healthy sense of belonging towards their program". The evaluators also found that the program "is served by instructors, administrative staff and technical personnel who are proud of their work, collegial, supportive and willing to improve".

The report makes **Six (6)** recommendations. We take all the recommendations seriously and feel confident that by addressing them, our undergraduate program will become stronger. The recommendations and our responses are included below.

Recommendation 1: Trainings for academic, administrative, and technical support personnel, as well as teaching assistants, are recommended to instil a culture of equity, diversity, and inclusion (EDI).
Unit response: We recognize the importance of instilling a culture of equity, diversity, and inclusion (EDI). We also recognize the need for EDI training for academic, administrative, and technical staff, as well as teaching assistants. In addition to faculty level initiates to be led by the Vice-Dean EDI & Governance (who will lead a taskforce for EDI training and integration), the position of CVG EDI Coordinator was created in March 2022 and assigned to a civil engineering professor to promote and implement an EDI culture in our program. The CVG EDI Coordinator will recommend EDI training to academic, administrative and technical staff, and we will include EDI training in our annual TA workshop. We will also introduce EDI concepts in our undergraduate courses.
Decanal response: I agree and support the actions proposed by the unit.
Priority Level*: Important
Actions to be undertaken: A professor of the CVG Department has been appointed as the CVG EDI coordinator. The CVG EDI coordinator has formed an EDI Task force Committee and has already held committee meetings. The CVG EDI coordinator will develop an action plan to address and enhance EDI aspects at all levels of our CVG program.
Assigned to: CVG-Chair, CVG-EDI Coordinator
Timeline: Completed (April 2023)
Curriculum change? No
Priority Level: Important
Actions to be undertaken: Academic, administrative and technical support staff to be made aware of online resources and training on EDI recommended by the University of Ottawa: - "EDI internal resources" and "Online training on EDI" available at: - https://www.uottawa.ca/research-innovation/equity-diversity-inclusion/resources
Assigned to: CVG-EDI Coordinator
Timeline: March 2024
Curriculum change? No

* PRIORITY LEVEL: 1. URGENT-Immediate action required 2. IMPORTANT-Action required within 18 months (maximum)
3. ADVISED: DEVELOPMENT AND STRATEGY-Action to be discussed and must be in place by mid-cycle (within 4 years)

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Priority Level: Important
Actions to be undertaken: CVG EDI Coordinator to recommend online EDI training for professors, administrative and technical support staff, and teaching assistants. In the short term, professors will be encouraged to complete the following online EDI trainings which are recommended by the University of Ottawa: - *Unconscious bias training module* - Canada Research Chairs - https://www.chairs-chaires.gc.ca/program-programme/equity-equite/bias/module-eng.aspx?pedisable=true - *Training on EDI in Higher Education and Research* - Chaire pour les femmes en sciences et en génie au Quebec - https://cfsg.espaceweb.usherbrooke.ca/formation-en-equite-diversite-et-inclusion/
Assigned to: CVG EDI Coordinator
Timeline: September 2024
Curriculum change? No
Priority Level: Important
Actions to be undertaken: Introduce EDI training for teaching assistants (TA) in the annual TA workshop.
Assigned to: CVG Lead - TA Workshop Coordinator, CVG EDI Coordinator
Timeline: September 2024
Curriculum change? No
Priority Level: Important
Actions to be undertaken: Introduce EDI concepts in Civil engineering courses, including in the CVG1107/1507 seminar course (first year) and CVG4001/4907 capstone course (fourth year), including through guest lectures.
Assigned to: CVG-Curriculum committee, Associate Chair for Undergraduate Studies
Timeline: September 2024
Curriculum change? Not anticipated (concepts will be introduced in existing courses)

[*] PRIORITY LEVEL: 1. URGENT-IMMEDIATE ACTION REQUIRED 2. IMPORTANT-ACTION REQUIRED WITHIN 18 MONTHS (MAXIMUM) 3. ADVISED: DEVELOPMENT AND STRATEGY-ACTION TO BE DISCUSSED AND MUST BE IN PLACE BY MID-CYCLE (WITHIN 4 YEARS)

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Recommendation 2: In future hiring, it is recommended that the Department of Civil Engineering consider gender and other equity gaps more proactively.
Unit response: We are committed to ensuring equity, diversity and inclusion in the scholarly and leadership environments of our students, staff, and faculty. Accordingly, we strongly encourage applications from Indigenous persons, visible minorities members (racialized persons), persons with disabilities, women, as well as from all qualified candidates with the skills and knowledge to productively engage with equitable, diverse and inclusive communities. Two of the recent hires of the department (Environmental Engineering, Sustainable Building Engineering) are women. We agree with the recommendation and will continue to proactively consider underrepresented groups, gender and equity gaps in future hiring. We will also seek assistance from the new VD EDI (Engineering) and new VP EDI (Central) when drafting new job postings to ensure best practices are taken into account.
Decanal response: I agree and support the actions proposed by the unit.
Priority Level*: Advised
Actions to be undertaken: We will continue to proactively consider underrepresented groups, gender and equity gaps when hiring new professors. We will also seek assistance from the new VD EDI (Engineering) and new VP EDI (Central) when drafting new job postings to ensure best practices are taken into account.
Assigned to: CVG-Chair
Timeline: Ongoing (when positions become available)
Curriculum change? No

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3. ADVISED: DEVELOPMENT AND STRATEGY-ACTION TO BE DISCUSSED AND MUST BE IN PLACE BY MID-CYCLE (WITHIN 4 YEARS)

Recommendation 3: Improve communication and working conditions of part-time professors.
Unit response: Policies and working conditions for part-time professors are set in the collective agreement between the Association of Part-Time Professors of the University of Ottawa (APTPUO) and the University of Ottawa. However, we recognize the need to further improve communication and help for part-time professors. We will strive to post course descriptions and announce hiring earlier to allow part-time professors more time to prepare their courses. In addition, each course will be assigned a regular professor as a resource/contact person in order to provide a support system for the part-time professors.
Decanal response: I agree and support the actions proposed by the unit. Furthermore, part-time professors have now been given voting participation in the Faculty Council. Working conditions of the part-time professors are determined by the collective agreement with the University.
Priority Level*: Important
Actions to be undertaken: Descriptions of courses will be posted as early as is reasonably possible prior to the commencement of the course to allow for sufficient preparation time (at least one month) for part-time professors prior to the commencement of the course.
Assigned to: CVG-Chair, Senior Administrative Officer
Timeline: September 2023 (ongoing)
Curriculum change? No
Priority Level: Important
Actions to be undertaken: Regular professor(s) will be identified as resource and contact person(s) for each course. In addition, we will create a focus group to better understand the needs of part-time professors.
Assigned to: CVG Associate Chair for Undergraduate Studies
Timeline: September 2024
Curriculum change? No

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Recommendation 4: Ensure that the student-to-teaching assistant ratio does not exceed 15, so the students benefit from the laboratories.
Unit response: We recognize the importance of having an appropriate student-to-teaching assistant (TA) ratio in courses with laboratory components. It is important to note that the budget for hiring TAs is dependant on the budget provided by the University of Ottawa. Currently the department of Civil Engineering maintains a student-TA ratio of 20-1 for courses with laboratory components. We will aim to continue to reduce the student-TA ratio in lab courses when the available budget permits. Moreover, an experienced "lead TA" will be assigned to lab courses to better organize lab activities in these courses. We will also work with the undergraduate office to open additional lab sections in courses with large enrolment. We will also encourage professors to utilize lab videos or reduce the number of physical labs in heavy-loaded lab courses. In addition, the department created the position of Student Experience Lead in March 2022 and assigned it to a GVC professor. The Student Experience Lead will conduct a student survey to identify courses where labs could be improved.
Decanal response: This recommendation will be considered within the budgetary constraints of the Faculty and the University and the ratio of student to TA will remain equitable with other programs within the Faculty and will respect the financial constraints.
Priority Level*: Important
Actions to be undertaken: We will aim to continue to reduce the student-TA ratio in lab courses, when the available budget permits.
Assigned to: CVG Chair, Senior Administrative Officer
Timeline: Ongoing (when budget permits)
Curriculum change? No
Priority Level: Important
Actions to be undertaken: An experienced "lead TA" will be assigned to better organize lab activities in heavy-loaded lab courses.
Assigned to: CVG Chair, Senior Administrative Officer
Timeline: September 2023
Curriculum change? No

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Priority Level: Important
Actions to be undertaken: Work with the undergraduate office to open additional lab sections in courses with large enrolment, when resources permit.
Assigned to: Associate Chair for Undergraduate Studies, CVG Chair
Timeline: September 2024
Curriculum change? No
Priority Level: Advised
Actions to be undertaken: Encourage professors to utilise lab videos or reduce the number of physical labs in heavy-loaded lab courses. For instance, online lab videos were developed in several courses during the pandemic (e.g. CVG3148 and CVG3116), and these videos can be used to improve the laboratory experience of students.
Assigned to: Associate Chair for Undergraduate Studies, CVG Professors
Timeline: September 2024 (ongoing)
Curriculum change? Not anticipated
Priority Level*: Advised
Actions to be undertaken: Conduct Student Experience Survey to identify courses were laboratories could be improved. One survey has already been completed and the results will be discussed during the annual CVG department retreat.
Assigned to: Student Experience lead, CVG Chair
Timeline: May 2023 (ongoing)
Curriculum change? No

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Recommendation 5: Enhance communication regarding student mental health issues at the program level, as well as between program, faculty, and university levels.
Unit response: We recognize the importance of recognizing student mental health issues, and enhancing communication regarding student mental health issues at the program level, as well as between the program, faculty and university levels. We will follow the recommendations from the new Vice-Dean EDI & Governance on how to best address mental health issues and improve communication. We will also update the CVG syllabus templates to include information related to mental health and wellness resources at the University of Ottawa (https://www.uottawa.ca/about-us/provost/mental-health-wellness). Professors and staff in the program will also be encouraged to complete available online training to *Learn how to recognize, respond and refer students experiencing mental health issues on campus* (e.g. *More Feet on The Ground* training, available at: https://morefeetontheground.ca/).
Decanal response: As indicated in the unit response, the university has taken several steps to support the mental health of students and the Faculty supports this. Many resources have been deployed as well as clear leadership from the University Advisor on Mental Health and Wellness. The University has established a Student Health and Wellness Centre and our Vice-Dean Undergraduate was engaged in the work leading up to its creation.
Priority Level*: Important
Actions to be undertaken: Update the CVG syllabus templates to include information related to mental health and wellness resources at the University of Ottawa
Assigned to: CVG Associate Chair, CVG Curriculum committee
Timeline: September 2023
Curriculum change? No
Priority Level: Advised
Actions to be undertaken: Professors, teaching personnel and staff will be invited to complete available online training to *Learn how to recognize, respond and refer students experiencing mental health issues on campus* (e.g. *More Feet on The Ground* training, available at: https://morefeetontheground.ca/). Moreover, the department will study the possibility of making this training mandatory.
Assigned to: CVG Chair
Timeline: September 2023
Curriculum change? No

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Recommendation 6: Modernize the curriculum with an emphasis on innovation, EDI, and the development of more timely options to the world's grand challenges.
Unit response: We are committed to modernizing our curriculum with an emphasis on innovation, EDI, and the development of more timely options to the world's grandchallenges. To promote innovation, we have recently introduced an accelerated master's program where students can complete a combined undergraduate and master's program in five years, while being exposed to research in their fourth year of studies. We plan to introduce a new concentration/option in "Sustainability" to expose students to principles of sustainability in all areas of the civil engineering. We have also introduced new courses on timely topics such as: *Sustainable Building Design*, and *Water Treatment in Northern Communities* which are taught by newly hired professors. In addition, we intend to introduce a new course on the application of artificial intelligence (AI) in Civil Engineering. We will also allocate discussion time at the annual department retreats to explore ideas on how to further modernize the curriculum with an emphasis on innovation, EDI, and today's major global challenges in civil engineering, including: Climate Change, Sustainability, Ageing Infrastructure, Disaster Resilience International Development, Accessibility and Mobility, and Urbanization.
Decanal response: I agree and support the actions proposed by the unit. Sustainability is a guiding principle of the Faculty's 3-year plan. We have been leading a consultation of alumni and external leaders in sustainability to help in advising us and I have met several alumni and industry members. The objective is to accomplish changes by the deadline indicated below.
Priority Level*: Advised
Actions to be undertaken: Introduce a new "Sustainability" option in the Civil Engineering program.
Assigned to: CVG-Chair, CVG-Associate Chair
Timeline: September 2025
Curriculum change? Yes
Priority Level: Advised
Actions to be undertaken: Introduce new course on Artificial Intelligence (AI) in Civil Engineering.
Assigned to: CVG-Chair
Timeline: September 2025
Curriculum change? Possible

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3. ADVISED: DEVELOPMENT AND STRATEGY-ACTION TO BE DISCUSSED AND MUST BE IN PLACE BY MID-CYCLE (WITHIN 4 YEARS)

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Priority Level: Advised	
Actions to be undertaken: Allocate discussion time at the annual department retreats to explore ideas on how to further modernize the curriculum with an emphasis on innovation, EDI, and the development of courses and/or options to meet the world's grand challenges	
Assigned to: CVG-Chair	
Timeline: June 2023 (ongoing)	
Curriculum change? Possible	

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